DIGITALIZING QUALITY INFRASTRUCTURE
Harnessing the opportunities & overcoming the challenges

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Outline

INTRODUCING UNIDO

DIGITAL TRANSFORMATION & INDUSTRY 4.0

QUALITY INFRASTRUCTURE & DIGITAL TRANSFORMATION

HELPING COUNTRIES NAVIGATE CHANGE – UNIDO’S ROLE
INTRODUCING UNIDO
UNIDO’s mission echoes **SDG9: Build resilient infrastructure, promote sustainable industrialization and foster innovation**

UNIDO also aligns with all other development goals, including those related to poverty eradication, creating full and productive employment, protecting the environment, achieving gender equality and the empowerment of women and girls, etc.
Sustainable Development Goals
Inclusive and Sustainable Industrial Development

**ECONOMIC COMPETITIVENESS**
Industrial growth, increased trade, and technological progress, via modern industrial policies

**SHARED PROSPERITY**
Inclusive growth with equal opportunities for all people, via partnerships with all relevant stakeholders

**SAFEGUARDING THE ENVIRONMENT**
Environmentally sustainable growth, via cleaner industrial technologies and production methods
UNIDO Functions

- Technical Cooperation
- Analytical and Research Functions and Policy Advisory Services
- Normative Functions and Standards and Quality-Related Activities
- Convening and Partnerships for Knowledge Transfer, Networking and Industrial Cooperation
UNIDO Areas of Technical Assistance

- Energy
- Agri-Business Development
- Environment
- Digitalization, Technology & Innovation
- Quality Infrastructure & Smart Production
- Partnerships & Results Monitoring

Field Representation
DIGITAL TRANSFORMATION & INDUSTRY 4.0
The repercussions of the pandemic in all aspects of our lives have accelerated the Fourth Industrial Revolution (4IR), with COVID-19 becoming a **driver for digital transformation**!

**Crisis amidst an ongoing Paradigm Change**

- **Profound and long-lasting impacts** on how we work, innovate, live, and interact
- **Unique opportunity to future-proof productive sectors** and foster long-term resilience

There is no way back!
Industrial Revolutions in Perspective

1. MECHANIZATION
   Steam and water power

2. ELECTRIFICATION
   Mass production

3. AUTOMATION
   Computers, CAD-CAM

4. DIGITALIZATION
   Cyber-physical systems

5. SOCIETY 5.0
   Quantum Computing
People at the Core

Digital transformation
Environment
Society
Industry 4.0
People

SUSTAINABILITY

DATA

11
Digital Transformation & the Role of UNIDO
UNIDO Vision & Mission on 4IR

DIGITAL, GENDER-RESPONSIVE, SUSTAINABLE TRANSFORMATION

Making the 4IR work for all

- Smart production of advanced climate action
- Innovation and the 4IR harnessed for economic development
- Improving livelihoods using 4IR technologies
Smart Technical Cooperation

- Roadmapping & Policy Advice
- Global Partnerships
- Global Forum & Awareness Raising
- Application of New Technologies
- Quality Infrastructure 4.0
- Skills Development
- Investment Promotion
- Innovation & Smart Production
QUALITY INFRASTRUCTURE & DIGITAL TRANSFORMATION
Quality Infrastructure

UNIDO’S APPROACH:
SYSTEMIC &
BASED ON MARKET NEEDS
QI & the SDGs

BUILDING PROSPERITY

MEETING THE NEEDS OF PEOPLE

PROTECTING THE PLANET
Digital Transformation & Quality Infrastructure
The path forward

QI institutions need to catch up with the 4IR pace of development to support the development of sustainable industry and infrastructure better.

- Developing, disseminating and facilitating the adoption of new standards associated to 4IR technologies and their harmonization to ensure interoperability, improve safety and security regulations and risk management, and facilitate their adoption by stakeholders.
- Developing metrology, standards and conformity assessment procedures to assess and improve the ecological performance of materials and products and support the energy efficiency of products and systems.
- Metrology, standards, accreditation, and CA procedures for the testing, inspection and certification capabilities required to support the sustainable management of organizations, global supply chains, and associated environmental and social responsibility aspects.
Digitalizing QI vs. QI for Digital Transformation

- Digitalization & Digital Transformation
- (E-)Quality Infrastructure

Quality Infrastructure in support of digital transformation

Application of new technologies in Quality Infrastructure
Standards & Digital Transformation

In the context of digital transformation, the timely and harmonized adoption of standards is likely to play a key role both as a means of promoting interoperability, productivity and innovation and of ensuring that new solutions are safely and successfully implemented on a global scale.
Digitalization of Standardization & NSBs

**CONTENT CREATION**
- **Digital document:** digital representation
- **Machine-readable document:** structured document format
- **Machine-readable content:** earmarked information
- **Machine-interpretable content:** Information models describing and explaining the content and the relationships between items of information, self-learning analysis
- **Machine-controllable content:** The content of a standard is be amended automatically and adopted by automated decision-making processes.

Source: DIN
Metrology 4.0

The metrology of the future will be intelligent and networked, and take on an important role in the control of production in the smart factory of the future.

Metrology 4.0 is used to describe existing innovations in non-contact metrology, such as applying smart measuring sensors, 3D scanning, and mobile-tools for real-time calibration and measurement.

- Smart: measures automatically and quickly
- Connected: communicates measuring data (between hardware and software)
- Controlled: cloud monitoring through sensors
- Autonomous: adjustment of measures, e.g. variant tolerances
Remote Assessment

Opportunities, Challenges & Implications

While remote assessment techniques existed before the global pandemic, they are now here to stay.

Remote assessment for accreditation, management system certification, product and personnel certification, validation and verification, certification of voluntary sustainability standards, organic certification, peer evaluation and many more.
Smart Laboratories
Conformity Assessment in a Digital Age

Where automation and informatics can come together to drive change. Examples of the kinds of technologies in Smart Laboratories include:

- **AI and machine learning**, such as using digital images in a semi-automated process to reduce mistakes and take away the uncertainty of conformity assessments in industrial testing.

- **Big Data**, to help the management and analysis of the increasing qualities and types of data available for testing and inspecting products.

- **Cloud computing**, to share data instantly, report issuing and automate certification. This has already been developed in some CABs, resulting in greater insight for customers and their supply chains.
Drones & Sensors for Inspection
Conformity Assessment in a Digital Age

- Drones offer new ways of conducting **remote inspections** and aerial mapping. They can be equipped with multispectral sensors for precise measurements in agriculture, or thermal cameras for measuring heat distribution.

- Sensors will also play an increasingly important role in **process control and automated production lines**. This can bring greater opportunities for connectivity, data sharing and integration with logistics, providing valuable data and feedback from markets.
Blockchain for Traceability in Ghana
Linking producers and consumers

A new means of transparent, secure and decentralized verification of certificates, particularly important for data safety and reliability of services in e-commerce.

UNIDO has identified blockchain technology – currently being piloted in Ghana – as a way to improve traceability, transparency and trade potential in the cocoa value chain. The technology has the potential to increase efficiency and reduce costs by providing accurate and complete data in real-time, to support domestic and international markets. UNIDO is consulting at the regional level to see how these new technologies might serve the whole region.
UNIDO link to eQuality

The eQuality certificate is a unique document that issued by an authority, which states that the agricultural product (plant and animal origin) meets certain qualification criteria. The document is signed and uniquely marked by the issuing authority.

QUALITY INFRASTRUCTURE

- Internationally recognized standards & accreditation bodies with required quality management scope
- Relevant inspection body complies with ISO 17020
- Electronic signature system
- Support to the industry (exporter, importer and transporter) on proper data management
- Partnership among relevant national authorities (inspection, customs)
HELPING COUNTRIES NAVIGATE CHANGE – UNIDO’S ROLE
Embracing the Future

An important aspiration for developing countries is not simply to cope with change, but to become leaders and technological innovators in their own right. **UNIDO’s role as a convener of partnerships can be crucial in this respect, by allowing for the proper exchange of knowledge and experience.** Ultimately, this means it will become easier to adapt technologies to the needs of the market, and pilot new technology further down the line.
Key Elements to make the New Industrial Revolution work for all

- Regulatory framework, norms & standards
- Governance, technologies & innovation policies
- Partnerships, investment & infrastructure
- Innovation Ecosystems
- Business environment & entrepreneurship
- Digitalization at firm-level
- Skills & capacity building
THANK YOU